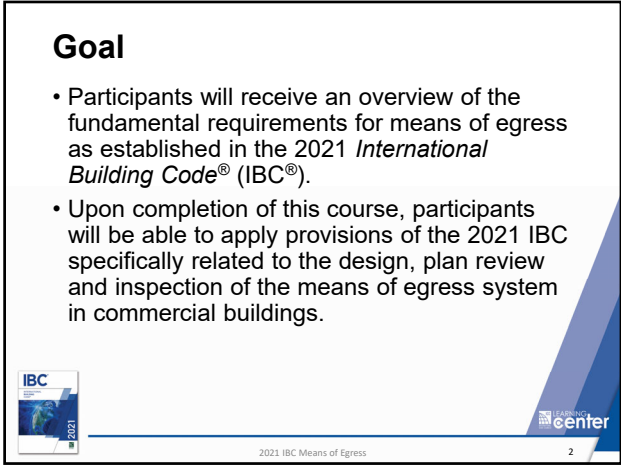
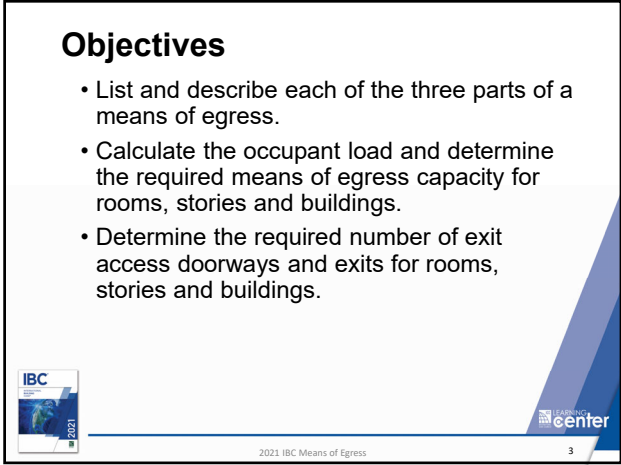


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3

Objectives

- Determine the requirements for arrangement of the means of egress elements, including:
 - Location of exit access doorways and exits.
 - Exit access travel distances.
 - Common paths of egress travel.
 - Any egress through adjoining spaces.
- Determine the requirements for means of egress components including corridors, stairways, exit passageways and horizontal exits.





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Objectives





- Determine the requirements for doors, including door swing, special doors and door hardware.
- Determine requirements for locations and illumination levels of means of egress lighting and signage.
- Determine the requirements for the exit discharge portion of the means of egress, including egress courts.





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Explanation of Icons

	This icon directs you to material in the International Codes.
	This icon indicates when an example is used to reinforce concepts in the handbook.
	The activities included in the handbook, indicated by this icon, provide an opportunity for you to practice applying the code.
	Look for this icon to indicate a process or procedure that is important for you to know and to be able to use on the job.



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Explanation of Icons

	Provides questions addressing critical areas.
	Based on real-world situations.
	Indicates discussion exercises for discussion with your peers.
	Introduced the final reflection exercise.
	Includes code language with explanations and discussions of major issues.

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Means of Egress Basics

Module 1

2021 IBC Means of Egress

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Means of Egress Basics in the IBC

Administration and Maintenance and Plans

- 1001 - 1002

General Means of Egress

- 1003 - 1015

Components of Means of Egress

- Exit Access 1016 - 1021
- Exits 1022 - 1027
- Exit Discharge 1028 - 1029

Miscellaneous

- Assembly 1030
- Emergency Escape and Rescue 1031



2021 IBC Means of Egress

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Definition of MEANS OF EGRESS

- A “Means of Egress”:
 - Continuous and unobstructed path of egress travel
 - Vertical and/or horizontal travel
 - Starts at any occupiable portion of a building or structure
 - Ends at public way





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Three Parts of a Means of Egress

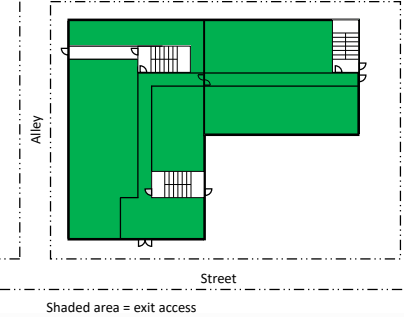
- A means of egress consists of three separate and distinct parts:
 - Exit access
 - Exit
 - Exit discharge
- While typically utilized as an organizational tool, the three-part means of egress concept also provides scoping, such as:
 - Extent of common path of egress travel
 - End point of travel distance measurement





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Exit Access

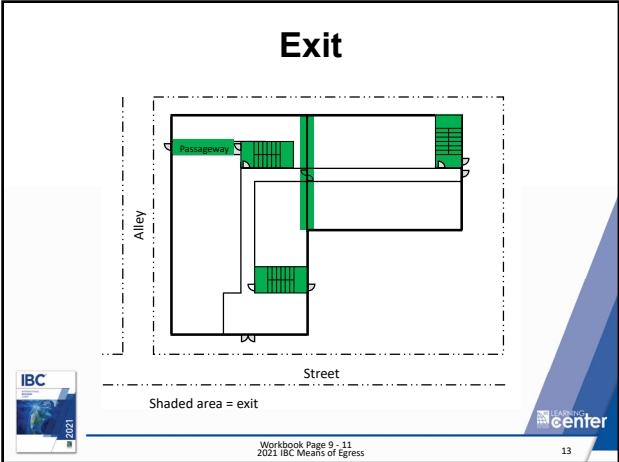


Shaded area = exit access

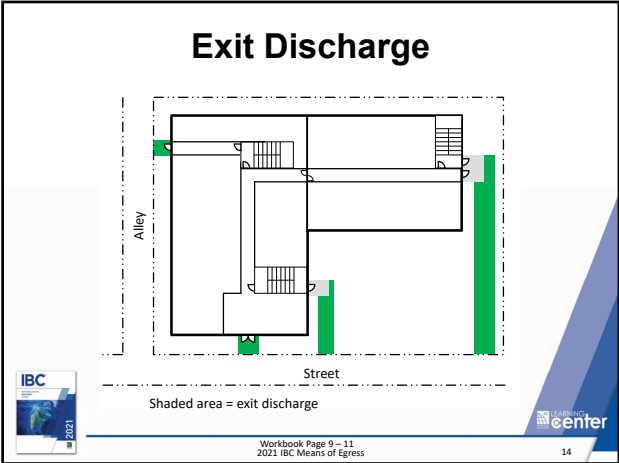


Workbook Page 9 - 11
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Occupant Load (OL) Section 1004

- Occupant load is used throughout the IBC to determine the application of a provision, particularly when addressing:
 - Means of egress
 - Fire protection features
 - Occupancy classification
 - Plumbing fixture count
- Occupant load is determined based on:
 - Fixed seating conditions, or
 - Conditions where fixed seating is not provided.





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Occupant Load (OL) Section 1004

- In areas with fixed seating—OL is based on seating capacity. Section 1004.6
 - For areas having fixed seating without dividing arms, such as benches and pews, occupant load to be based on one person for each 18 inches of seating length
 - For seating in booths, occupant load to be based on one person for each 24 inches of booth seat length
 - Measurement to be taken at backrest of booth





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Occupant Load (OL) Section 1004

- In areas without fixed seating—OL computed at the rate of one occupant per unit of area. Section 1004.5
- Table 1004.5 identifies maximum floor area allowances per occupant for areas without fixed seating.
 - The determination of occupant load is based upon:
 - Gross floor area, or
 - Net floor area



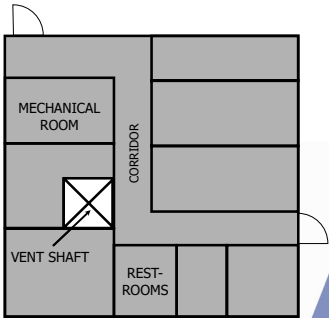
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Definition


Section 202

- Floor area, *gross*
- Shaded area indicates the portion included in the gross floor area





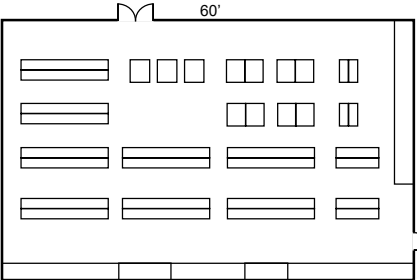
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Retail Sales/Mercantile





Occupant load = $1,800 \div 60 = 30$

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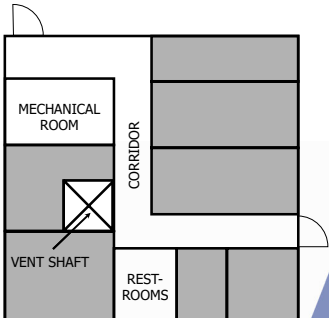
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Definition


Section 202

- Floor area, *net*
- Shaded area indicates the portion included in the net floor area






2021 IBC Means of Egress



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REFER TO



CODE BOOK

2021 IBC

Table 1004.5

Page 10-3

TABLE 1004.5 MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

TABLE 1004.5
MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR ^a
Accessory storage areas, mechanical equipment room	300 gross
Agricultural building	300 gross
Aircraft hangars	500 gross
Airport terminal	
Baggage claim	20 gross
Baggage handling	300 gross
Concourse	100 gross
Waiting areas	15 gross
Assembly	
Gaming floors (keno, slots, etc.)	11 gross
Exhibit gallery and museum	30 net
Assembly with fixed seats	See Section 1004.6
Assembly without fixed seats	
Concentrated (chairs only)—not fixed	7 net
Standing space	5 net
Unconcentrated (tables and chairs)	15 net
Bowling centers, allow 5 persons for each lane including 15 feet of runway, and for additional areas	7 net
Business areas	150 gross
Concentrated business use areas	See Section 1004.8
Courtrooms—other than fixed seating areas	40 net
Day care	35 net
Dormitories	50 gross

LEARNING center


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REFER TO



CODE BOOK

2021 IBC

Table 1004.5

Page 10-3

TABLE 1004.5 MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

Educational	
Classroom area	20 net
Shops and other vocational room areas	50 net
Exercise rooms	50 gross
Group 11-5 fabrication and manufacturing areas	200 gross
Industrial areas	100 gross
Institutional areas	
Inpatient treatment areas	240 gross
Outpatient areas	100 gross
Sleeping areas	120 gross
Kitchens, commercial	200 gross
Library	
Reading rooms	50 net
Stack area	100 gross
Locker rooms	50 gross
Mail buildings—covered and open	See Section 402.8.2
Mercantile	60 gross
Storage, stock, shipping areas	300 gross
Parking garages	200 gross
Residential	200 gross
Skating rinks, swimming pools	
Rink and pool	50 gross
Decks	15 gross
Stages and platforms	15 net
Warehouses	500 gross

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Occupant Load (OL)

Section 1004.5, Exception; 1004.5.1

- The occupant load as calculated based on Table 1004.5 may be decreased or increased to better represent the maximum anticipated number of occupants.
 - Reduction in calculated occupied load permitted where:
 - Approved by building official, and
 - Actual number of occupants can be determined.
 - Increase in calculated occupant load permitted where:
 - All code requirements met based on modified number, and
 - Occupant load does not exceed one occupant per 7 net square feet, and
 - Approved aisle, seating or fixed equipment diagram submitted when required by building official.

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LEARNING center

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Increased Occupant Load

Section 1004.5.1

EXAMPLE:

Office
15,000 square feet
Non-sprinklered

3'0" x 6'8" door
providing 32" clear width

44" exterior exit stairway

2021 IBC Means of Egress

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Occupant Load (OL)

Section 1004.2

- The cumulative occupant load is to be determined in accordance with IBC Section 1004.2:
 - Where occupants pass through intervening rooms—OL is cumulative for spaces along egress path.
Section 1004.2.1
 - Design of egress path capacity to be based on cumulative portion of occupant loads of all rooms, areas or spaces to that point along the path.
 - Where occupants on a mezzanine egress through an adjacent floor level—OL is cumulative for that level and the mezzanine(s) exiting through that level.
Section 1004.2.2
 - Where stairways serve adjacent stories, the occupant load from separate stories is not to be added.
Sections 1004.2.3 and 1005.6.

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Design Occupant Load

Section 1004.2.1

EXAMPLE:

Office
10 occupants → A

Office
10 occupants → B

Open office area
150 occupants → C

Lobby
10 occupants → D

Door #4 sized to accommodate 100 occupants

Lobby D only requires a single exit

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Adjacent Levels for Mezzanines

Section 1004.2.2

Occupant load of mezzanine added to room below when egress is through the space

Capacity of exits designed for total occupant load

Mezzanine

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Occupant Load (OL)

Sections 1004.3, 1004.4

- Where areas contains multiple functions having different occupant load factors, design occupant load to be based on area of each function calculated independently.
- Where two or more occupancies utilize portions of the same means of egress system, all components to meet the more stringent requirements of occupancies served.

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Occupant Load (OL)

Section 1004.7

- Yards, patios, occupied roofs courts and similar outdoor areas usable by building occupants to be provided with means of egress per Chapter 10.
 - Occupant load to be based on anticipated use.
 - Where outdoor areas are used by persons in addition to building occupants, and egress path from outdoors passes through building, means of egress requirements to be based on sum of occupant loads.

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Outdoor Areas

Section 1004.7

Complying exits required

Yard

Patio or court

Occupant load determined by building official

Occupant load from outside added to building's occupant load when path of egress travel passes through building

Public Way

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Occupant Load Activity

Determine the following occupant loads

1. Occupant load for the 2,700 ft² accounting suite between column lines D and G on the 3rd floor.

$2,700 \div 150 = 18$

2. Occupant load for the Auditorium on the 2nd floor.

$63 + 220 + 70 = 353$

Any consideration for:

- stage/platform
- wheelchair allocation

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Occupant Load Activity

Determine the following occupant loads

3. Occupant load for the Audio-Visual storage room between column lines H and J on the 2nd floor.

One, based on 500 square feet per person for warehouse uses.

4. Occupant load for the cafeteria on the 1st floor.

$1,800 \div 15 + 200 \div 5 = 160$

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Occupant Load Activity



Determine the following occupant loads

5. Occupant load for Lab 3 in the basement.

$2,476 \div 50 = 49$

6. Occupant load for the 3rd floor 18,000 square feet North Wing.

$18,000 \div 150 = 120$





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Means of Egress Minimum Width and Required Capacity

Module 3





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Minimum Width vs. Required Capacity Section 1005

- All portions of means of egress to be sized per Section 1005, except:
 - Aisles and aisle accessways in assembly rooms and spaces complying with Section 1030.
- Minimum size of egress system to be based upon the greater of:
 - Component width (minimum width), and
 - Calculated width (required capacity)





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Minimum Width vs. Required Capacity Section 1005

- “Minimum width” is based on specific component under consideration, such as:
 - Aisles and corridors: Table 1020.2
 - Doorways: Section 1010.1.1
 - Stairways: Section 1011.2
- “Required capacity” is determined through calculations per Section 1005.3.





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Required Egress Capacity: Other Than Stairways Section 1005.3.2

- Required capacity of all egress components other than stairways, including doors, ramps, aisles and corridors:
 - Occupant load served multiplied by 0.2”
 - For other than Group H and I-2, the required capacity is occupant load served multiplied by 0.15”
IF
 - Building is equipped with an emergency voice/alarm communication system **and**
 - Building is equipped with an automatic fire sprinkler system (NFPA 13 or 13R)





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Required Egress Capacity: Stairways Section 1005.3.1

- Required capacity for stairways only:
 - Occupant load served multiplied by 0.3”
 - For other than Group H and I-2, the minimum width is occupant load served multiplied by 0.2”
IF
 - Building is equipped with an emergency voice/alarm communication system **and**
 - Building is equipped with an automatic fire sprinkler system (NFPA 13 or 13R)





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Stairway Capacity and Egress Convergence Sections 1005.3.1, 1005.6

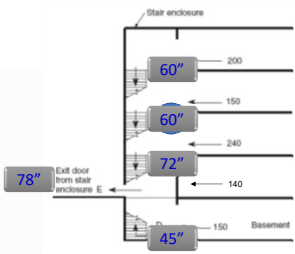
- Required capacity for the egress stairway shall be determined based solely on the occupant load of the adjacent story served by the stairway
- Where egress from stories above and below converge at an intermediate level, the capacity from point of convergence to be \geq sum of the stairway capacities for two adjacent stories



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Stairway Capacity and Egress Convergence Sections 1005.3.1, 1005.6



ASSUME: Stairway serving occupant loads in office building as shown. Building is sprinklered throughout but has no EV/AC system.

DETERMINE: Minimum stairway widths for stairway segments A-D and doorway width E, based on:

- 0.3'/person for stairways
- 0.2'/person for doorway





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Required Egress Width and Capacity Continuity Section 1005.4

- Minimum width or required capacity required from any story shall not be reduced along the path of egress travel until arrival at the public way.

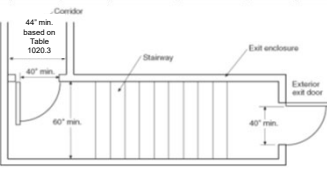


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Application Example

- Sprinklered building, but no EV/AC system
- Group B occupancy
- Corridor serves 400 occupants and connects two interior exit stairways.
 $200 \text{ (occupants)} \times 0.3 \text{ (stairs)} = 60'' \text{ exit width}$
 $200 \text{ (occupants)} \times 0.2 \text{ (other egress)} = 40'' \text{ exit width}$



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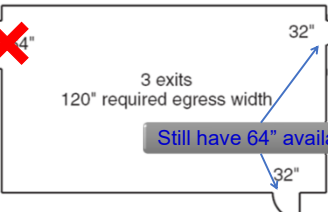
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Distribution of Minimum Width and Required Capacity Section 1005.5

- Multiple means of egress shall be sized such that the loss of any one means of egress will not reduce the available capacity or width to less than 50 percent of the required capacity or width.



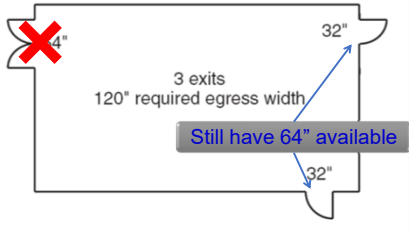
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Application Example



3 exits
120' required egress width

Still have 64" available

OK: The loss of any single exit will not result in less than half of required width or capacity remaining

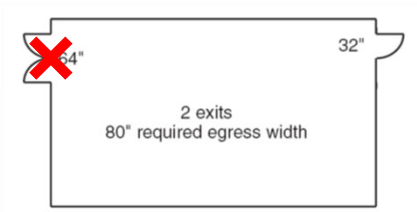
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Application Example



2 exits
80" required egress width

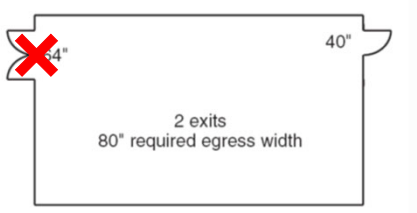
Not permitted: Loss of a single exit could result in less than half of required width or capacity remaining.



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Application Example



2 exits
80" required egress width

OK: Although double doors give greater than half of available width or capacity, not less than half of required width or capacity would still remain.





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Minimum Exit Width/Required Capacity Activity

- North wing of the 3rd floor:
 - What is required capacity for exit doors?
 $120 \times 0.2 = 24''$
 - Is the required door capacity provided?
YES
 - What is required capacity for stairways?
 $120 \times 0.3 = 36''$
 - Is the required stairway capacity provided?
YES



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Minimum Exit Width/Required Capacity Activity



2. North wing of the 2nd floor based on an occupant load of 789:

a. What is required capacity for exit doors?
 $789 \times 0.2 = 158''$

b. Is required door capacity provided?
NO

c. What is required capacity for stairways?
 $789 \times 0.3 = 237''$

d. Is required stairway capacity provided?
NO





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Number of Exits and Exit Access Doorways

Module 4





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Egress from Spaces Section 1006.2

- Two exits or exit access doorways are required from a space where:
 - The occupant load of the space exceeds the number shown in Table 1006.2.1, or
 - The common path of travel exceeds the limitations set forth in Table 1006.2.1.
- Requirements vary based on the occupancy classification, the occupant load and installation of sprinklers.
 - Unoccupied mechanical rooms and penthouses not required to comply with common path of egress travel measurement.





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Common Path of Egress Travel Sections 202, 1006.2

- COMMON PATH OF EGRESS TRAVEL.
That portion of the exit access travel distance measured from the most remote point within a story to that point where the occupants have separate and distinct access to two exits or exit access doorways.





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Common Path of Egress Travel Sections 202, 1006.2

Common Path of Travel?
NO

Common path of egress travel ends where there is choice of separate access to two exits or exit access doorways.



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Minimum Number of Exits or Exit Access Doorways Section 1006.2.1

- Every space shall have access to at least one MOE
- Two MOE when the occupant load is above the threshold in Table 1006.2.1
- Two MOE when the common path of travel is exceeded

EXAMPLE

Area = 1200 ft²
O.L. Factor = 60 / person
O.L. = 20

Table 1006.2.1:
only one MOE ≤ 49



Retail

O.L. = 20

30'

40'

Allowable Common Path of Travel = 75'



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TABLE 1006.2.1 SPACES WITH ONE EXIT OR EXIT ACCESS DOORWAY

2021 IBC
Table
1006.2.1
Page 10-6

TABLE 1006.2.1
SPACES WITH ONE EXIT OR EXIT ACCESS DOORWAY

OCCUPANCY	MAXIMUM OCCUPANT LOAD OF SPACE	MAXIMUM COMMON PATH OF EGRESS TRAVEL DISTANCE (feet)		
		Without Sprinkler System (feet)		With Sprinkler System (feet)
		Occupant Load		
		OL ≤ 30	OL > 30	
A, E, M	49	75	75	75 ^a
B	49	100	75	100 ^a
F	49	75	75	100 ^a
H-1, H-2, H-3	3	NP ^b	NP ^b	25 ^c
H-4, H-5	10	NP ^b	NP ^b	75 ^c
I-1, I-2 ^d , I-4	10	NP ^b	NP ^b	75 ^c
I-3	10	NP ^b	NP ^b	100 ^a
R-1	10	NP ^b	NP ^b	75 ^c
R-2	20	NP ^b	NP ^b	125 ^{a, e}
R-3 ^f	20	NP ^b	NP ^b	125 ^{a, g}
R-4 ^f	20	NP ^b	NP ^b	125 ^{a, g}
S ^h	29	100	75	100 ^a
U	49	100	75	75 ^a

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

- a. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.2.5.
- b. Group H occupancies equipped throughout with an automatic sprinkler system in accordance with Section 903.2.5.
- c. For a room or space used for assembly purposes having fixed seating, see Section 1030.8.
- d. For the travel distance limitations in Group I-2, see Section 407.4.
- e. The common path of egress travel distance shall only apply in a Group R-3 occupancy located in a mixed occupancy building.
- f. The length of common path of egress travel distance in a Group S-2 open parking garage shall be not more than 100 feet.
- g. For the travel distance limitations in Groups R-3 and R-4 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3, see Section 1006.2.2.6.

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Minimum Number of Exits
Section 1006.2.1.1

- Three exits or exit access doorways to be provided from any space where occupant load is 501 to 1,000

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Minimum Number of Exits
Section 1006.2.1.1

- Minimum of four exits or exit access doorways required from any space where occupant load >1,000

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center

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Egress from Stories and Occupied Roofs

Section 1006.3.2

- With exceptions, the path of egress travel to an exit shall not pass through more than one adjacent story.

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Minimum Number of Exits from Stories and Occupied Roofs

Section 1006.3.3

- Each story and occupied roof to have minimum number of exits, or access to exits, as set forth in Table 1006.3.3.

OCCUPANT LOAD PER STORY	MINIMUM NUMBER OF EXITS OR ACCESS TO EXITS FROM STORY
1-500	2
501-1,000	3
More than 1,000	4

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Number of Exits per Story

Section 1006.3.3

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- The required number of exits, or exit access stairways, from any story or occupied roof to be maintained until arrival at grade or the public way.

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Single Exits Section 1006.2

- A single exit or access to a single exit permitted where in compliance with Table 1006.3.4(1) or 1006.3.4(2)

STORY	OCCUPANCY	MAXIMUM NUMBER OF DWELLING UNITS	MAXIMUM EXIT ACCESS TRAVEL DISTANCE
Basement, first, second or third story above grade plane	R-2 ^a	4 dwelling units	125 feet
Fourth story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.
NP = Not Permitted.
NA = Not Applicable.
a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.
b. This table is used for R-2 occupancies consisting of dwelling units. For R-2 occupancies consisting of sleeping units, use Table 1006.3.4(2).

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2021 IBC
Table 1006.3.4(2)
Page 10-8

Table 1006.3.4(2) Stories With One Exit Or Access To One Exit For Occupancies Other Than Group R-2

STORY	OCCUPANCY	MAXIMUM OCCUPANT LOAD PER STORY	MAXIMUM EXIT ACCESS TRAVEL DISTANCE (feet)
First story above or below grade plane	A, F ^a , E, F ^a , M, U	49	75
	H-2, H-3	3	25
	H-4, H-5, I, R-1, R-2 ^a	10	75
	S ^a	29	75
Second story above grade plane	R, F, M, S ^a	29	75
Third story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.
NP = Not Permitted.
NA = Not Applicable.
a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.
b. Group B, F and S occupancies in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 shall have a maximum exit access travel distance of 100 feet.
c. This table is used for R-2 occupancies consisting of sleeping units. For R-2 occupancies consisting of dwelling units, use Table 1006.3.4(1).
d. The length of exit access travel distance in a Group R-2, open parking garage shall be not more than 100 feet.

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Number of Exits and Exit Access Doors Activity

Calculate the number of exit access doorways or exits required in the following locations:

- Conference room on **3rd Floor** (OL = 68) between Column lines 3 and 4:
Are the required number of means of egress provided?

YES, but only if door to clerical office complies with means of egress provisions
- Accounting office area (OL = 18) on the **3rd Floor** between column lines 3 and 4:
Are the required number of means of egress provided?

YES

2021 IBC Means of Egress

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Number of Exits and Exit Access Doors Activity



Calculate the number of exit access doorways or exits required in the following locations:

3. **2nd Floor** lecture halls (OL = 188 each) across from elevator lobby:

Are the required number of means of egress provided?

4. Cafeteria on **1st Floor** (OL =160):

Are the required number of means of egress provided?



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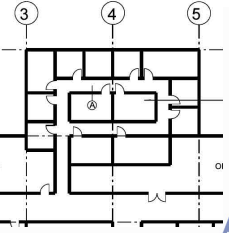
Number of Exits and Exit Access Doors Activity

5. Evaluate the common path of travel for the Teaching Assistants' office area on the **3rd Floor**. How is it to be measured?

Measured from point 5A along most direct egress path to corridor intersection at point C and 3.4

Does it comply?

YES. Actual travel is approximately 95'; 100' is permitted.



2021 IBC Means of Egress 65

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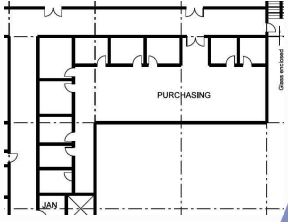
Number of Exits and Exit Access Doors Activity

6. Evaluate the common path of travel for the Purchasing Suite on the **3rd Floor**. How is it measured?

Measured from point E and 4.3 along most direct egress path to corridor intersection at point C/6.2.

Does it comply?

NO. Actual travel is approximately 110'; 100' is permitted.





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Arrangement of Means of Egress Elements



Module 5



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Design of Exit Access Elements

- Once the egress capacity and number of required egress elements is determined, the following provisions must be addressed:
 - Separation of multiple exits and/or exit access doorways. Section 1007
 - Means of egress travel through intervening spaces. Section 1016.2
 - Exit access travel distance limitations. Section 1017
 - Dead-end corridor conditions. Section 1020.5



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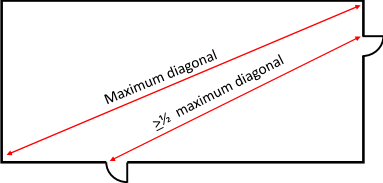
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Exit or Exit Access Doorway Arrangement

Section 1007.1.1

- Where two exits or exit access doorways are required, they are to be separated a minimum distance of $\frac{1}{2}$ of the maximum overall diagonal dimension of the building or area served.





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Exit or Exit Access Doorway Arrangement

Section 1007.1.1

• All measurements to be taken in a straight line.

≥ ½ maximum diagonal

Maximum diagonal

≥ ½ maximum diagonal

Maximum diagonal

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Exit or Exit Access Doorway Arrangement

Section 1007.1.1

• Both building and areas served to be regulated

Room A

Room B

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Exit or Exit Access Doorway Arrangement

Section 1007.1.1, Exception 1

• Exception 1 allows for required exit separation to be measured along shortest direct line of travel within corridor.

1-hour fire-resistance-rated corridor

Exit separation measured along line of travel

Diagonal

Maximum

Overall

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Exit or Exit Access Doorway Arrangement Section 1007.1.1, Exception 1

1-hour fire-resistance-rated corridor

Diagonal

Overall

Maximum

Exit separation measured along "shortest direct" line of travel

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Exit or Exit Access Doorway Arrangement Section 1007.1.1, Exception 2

- Exception 2 recognizes that when the building is fully sprinklered, the minimum required separation distance may be reduced to 1/3 the maximum overall diagonal.

Maximum Overall Diagonal

≥ 1/3 max diagonal

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Exit or Exit Access Doorway Arrangement Section 1007.1.2

Separation measured at any point along the width of the doorway

Separation as required by Section 1007.1.1 for two of the doorways

- One-half of overall diagonal, or
- One-third of diagonal if sprinklered

Additional route "a reasonable distance apart" to prevent both being blocked

Space requiring three or more means of egress

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Egress Through Intervening Spaces Section 1016.2, #1

- Egress through an elevator lobby permitted.
 - Where access to two or more exits or exit access doorways is required, access to at least one of the required exits to be provided without travel through the enclosed elevator lobby.
 - Level of protection required for elevator lobby not required to be extended to the exit, unless required by other sections of the code.

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Egress Through Intervening Spaces Section 1016.2, #2

- Egress from or room or space shall not pass through an adjoining room or space except where:
 - Intervening rooms are related to the area or room served, and
 - Intervening room is not a Group H occupancy, and
 - Path of egress travel is clear and discernible to an exit
- Intervening rooms cannot have potential to be locked to prevent egress

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Egress Through Intervening Spaces Section 1016.2

- Example:
 - Third floor office area
 - Intervening rooms

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Egress Through Intervening Spaces

Section 1016.2, #2, Exception

- In Group H occupancies, travel through intervening rooms of the same or lesser hazard occupancy group is permitted.

The diagram shows a rectangular area divided into two sections. The left section is labeled 'Group H'. An arrow points from this section into the right section, which is labeled 'The same hazard or lesser hazard occupancy group'. Another arrow points from the right section to the right, indicating the direction of egress.

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Egress Through Intervening Spaces

Section 1016.2, #3 and #4

- Travel shall not pass through a room that can be locked to prevent egress.
- Means of egress travel from dwelling units and sleeping areas shall not pass through:
 - Other sleeping rooms
 - Toilet rooms and bathrooms

The diagram shows a rectangular area divided into two sections. The left section is labeled 'Dwelling units and sleeping areas'. An arrow points from this section into the right section, which is labeled 'Other sleeping rooms' and 'Toilet rooms and bathrooms'. Another arrow points from the right section to the right, indicating the direction of egress.

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Egress Through Intervening Spaces

Section 1016.2, #5

- Egress travel shall not pass through kitchens, storerooms, closets or spaces used for similar purposes

The diagram shows a rectangular area divided into two sections. The left section is labeled 'Dwelling units and sleeping areas'. An arrow points from this section into the right section, which is labeled 'Kitchen'. Another arrow points from the right section to the right, indicating the direction of egress. A red circle with a diagonal line through it is placed over the arrow pointing into the kitchen, indicating that this path is prohibited.

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Egress Through Intervening Spaces

Section 1016.2, #5, Exception 2

- Egress travel through stockrooms in Group M permitted where four conditions are met:

Only allowed in Group M if:

- not able to be locked from egress side
- physical demarcation of minimum 44" egress path
- serves maximum of 50% of exits
- stock is of same hazard classification as in sales area

Storage area or stockroom

Full height or partial height wall or other construction

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Exit Access Travel Distance

Section 1017.3

- Travel distance is limited within the exit access portion of the means of egress.
- Travel distance is measured:
 - From the most remote point of each room, area or space
 - Along a natural unobstructed path of vertical and horizontal egress travel
 - To the entrance of an exit.
- Where two or more exits are required, travel limits are based on the nearest exit.

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Exit Access Travel Distance

Section 1017.3

Measured from furthest point in room

Measured to nearest exit

Travel around temporary or movable fixtures must be considered

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Exit Access Travel Distance

Section 1017.3.1

Measurement of exit access travel distance continues for exit access stairs and ramps

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Travel Distance Measurement

- Measurement is to "nearest" exit

Choice of 2 directions of travel

A = 40 feet
B = 30 feet
C = 75 feet
145 feet

Common path of travel = 70'

Travel Distance = 145'

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REFER TO

CODE BOOK

2021 IBC

Table 1017.2

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TABLE 1017.2

EXIT ACCESS TRAVEL DISTANCE

TABLE 1017.2
EXIT ACCESS TRAVEL DISTANCE*

OCCUPANCY	WITHOUT SPRINKLER SYSTEM (feet)	WITH SPRINKLER SYSTEM (feet)
A, E, F-1, M, R, S-1	200 ^a	250 ^b
I-1	Not Permitted	250 ^b
B	200	300 ^c
F-2, S-2, U	300	400 ^c
H-1	Not Permitted	75 ^d
H-2	Not Permitted	100 ^d
H-3	Not Permitted	150 ^d
H-4	Not Permitted	175 ^d
H-5	Not Permitted	200 ^c
I-2, I-3	Not Permitted	200 ^c
I-4	150	200 ^c

For SI: 1 foot = 304.8 mm.


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REFER TO



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Table 1017.2
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TABLE 1017.2, notes EXIT ACCESS TRAVEL DISTANCE

a. See the following sections for modifications to *exit access* travel distance requirements:

- Section 402.8: For the distance limitation in malls.
- Section 407.4: For the distance limitation in Group I-2.
- Sections 408.6.1 and 408.8.1: For the distance limitations in Group I-3.
- Section 411.2: For the distance limitation in special amusement areas.
- Section 412.6: For the distance limitations in aircraft manufacturing facilities.
- Section 1006.2.2.2: For the distance limitation in refrigeration machinery rooms.
- Section 1006.2.2.3: For the distance limitation in refrigerated rooms and spaces.
- Section 1006.3.4: For buildings with one exit.
- Section 1017.2.2: For increased distance limitation in Groups F-1 and S-1.
- Section 1030.7: For increased limitation in assembly seating.
- Section 3103.4: For temporary structures.
- Section 3104.9: For pedestrian walkways.

b. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.2.

c. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

d. Group H occupancies equipped throughout with an automatic sprinkler system in accordance with Section 903.2.5.1.

e. Group R-3 and R-4 buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3. See Section 903.2.8 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.3.

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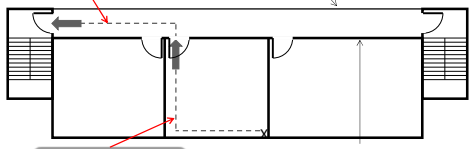
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Exterior Egress Balcony Increase Section 1017.2.1

Increased travel distance on exterior egress balcony – maximum 100'

Balcony open ≥ 50% on the exterior side



Travel distance allowed by IBC §1017.2

Interior wall and opening protection may be required

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Travel Distance Increase for Group F-1 and S-1 Occupancies Section 1017.2.2

- Maximum travel distance of 400 feet permitted in Group F-1 and S-1 occupancies where:
 - Portion of building classified as Group F-1 or S-1 limited to one story in height, and
 - Minimum floor to ceiling/roof deck height is 24 feet, and
 - Building is fully sprinklered.

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Dead Ends in Corridors

Section 1020.5

- Where **more than one exit or exit access doorway is required** from a corridor, dead-ends within the corridor system are limited in length.
- General limitation on dead-end corridors is 20 feet in length.

A schematic diagram of a corridor system. A main horizontal corridor has a dead-end branch on the right. A red double-headed arrow indicates the length of the dead-end branch, labeled '20' maximum with exceptions'. A dashed line with an arrow points to the left, indicating the direction of travel. The diagram is part of a presentation slide with IBC and ecenter logos at the bottom.

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Dead Ends in Corridors

Section 1020.5, Exceptions

- Where building is fully sprinklered (NFPA 13 system only), maximum dead conditions of 50 feet are permitted in Group B, E, F, I-1, M, R-1, R-2, S and U occupancies
- Maximum of 50 feet permitted in Group I-3 occupancies classified as Condition 2, 3 or 4
- Maximum of 30 feet permitted in Group I-2, Condition 2 occupancies where dead-end corridors do not serve patient rooms or patient treatment spaces
- Unlimited length permitted where the length of the dead-end corridor is less than 2.5 times the least width of the dead-end corridor.

A schematic diagram of a corridor system. A main horizontal corridor has a dead-end branch on the right. A red double-headed arrow indicates the length of the dead-end branch, labeled '20' maximum with exceptions'. A dashed line with an arrow points to the left, indicating the direction of travel. The diagram is part of a presentation slide with IBC and ecenter logos at the bottom.

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Dead Ends

Section 1020.5, Exception 3

- When $L \leq 2.5 \times W$, that portion of the corridor is not regulated for the dead-end condition.

A schematic diagram of a corridor system. A main horizontal corridor has a dead-end branch on the right. A red double-headed arrow indicates the length of the dead-end branch, labeled '20' maximum with exceptions'. A dashed line with an arrow points to the left, indicating the direction of travel. The diagram is part of a presentation slide with IBC and ecenter logos at the bottom.

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Arrangement of Exits and Exit Access Doors Activity

1. Evaluate the egress through adjoining spaces for compliance. Identify locations where egress through adjoining spaces does not comply.

Lab 3 in **Basement** – egress path through the operable partition

1020 ft² conference room on **3rd Floor** – door into adjoining clerical office



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Arrangement of Exits and Exit Access Doors Activity



2. Evaluate the separation of exits or exit access doors:

a. **1st Floor** Cafeteria – the longest diagonal is 77'

YES. 60' separation is provided

b. **1st Floor** Personnel Office – the longest diagonal is 68'

Not Applicable
Two means of egress are not required





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Arrangement of Exits and Exit Access Doors Activity

3. Evaluate the exit access travel distance. How would the allowed exit access travel distance be measured for the **Basement** Classroom at Column Line G/3?

COMPLIES
300' is allowed
Measure through the North/South corridor, then West to stairway door of interior exit stairway.



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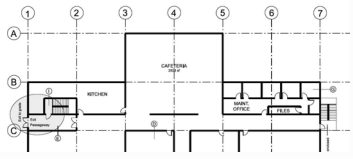
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Arrangement of Exits and Exit Access Doors Activity

4. Examine the Maintenance Office at Column Lines B/6 on the first-floor. Is there a noncomplying dead-end corridor?

NO

Only one means of egress is required.



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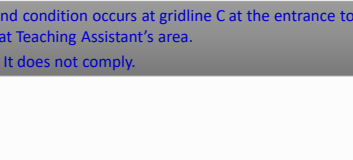
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Arrangement of Exits and Exit Access Doors Activity

5. Evaluate the corridors on the 3rd Floor. Identify any dead-end corridors and determine if they comply.

A dead-end condition occurs at gridline C at the entrance to corridor at Teaching Assistant's area. It is >50'. It does not comply.



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Doors and Door Hardware

Module 6



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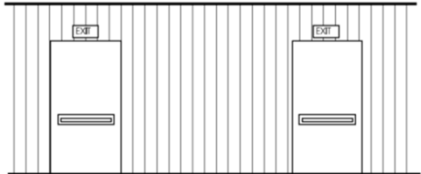
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Doors

Section 1010.1

- Doors installed for egress purposes in numbers greater than those required by the code must conform to all provisions of IBC Section 1010.





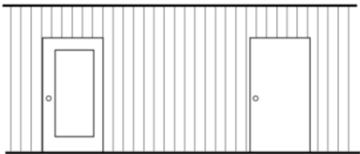
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Doors

Section 1010.1

- Egress doors must be really distinguishable from the adjacent construction and finishes
- Mirrors and similar reflecting materials are not to be used on egress doors.
- Egress doors must not be concealed by curtains, decorations or similar materials.



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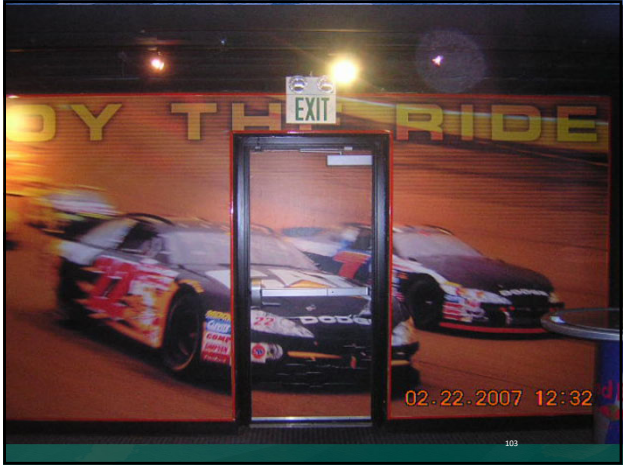
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Readily Identifiable ??



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Size of Doors

Section 1010.1.1

- Door openings to provide required capacity for occupant load served, but in no case shall the clear door opening be less than 32 inches in width.
 - Width of swinging doors to be measured between the face of the door and the stop, with the door open 90 degrees.



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Size of Doors

Section 1010.1.1

- Minimum clear door opening width not regulated:
 - Non-egress doors in Groups R-2 and R-3
 - Doors to storage closets less than 10 square feet in area
 - Complying revolving doors
 - Complying power-operated doors
 - Interior doors in a dwelling unit or sleeping unit that is not required to be an Accessible, Type A or Type B unit (applicable to only Group I-1, R-2, R-3 and R-4 occupancies)



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Size of Doors

Section 1010.1.1

- Required clear door opening width reduced from 32":
 - 28" in Group I-3 resident sleeping units not required to be an Accessible unit
 - 28" for doors serving non-accessible single-user shower and sauna compartments, toilet stalls, and dressing, fitting and changing rooms
 - 31.75" for accessible doors in Type B dwelling units

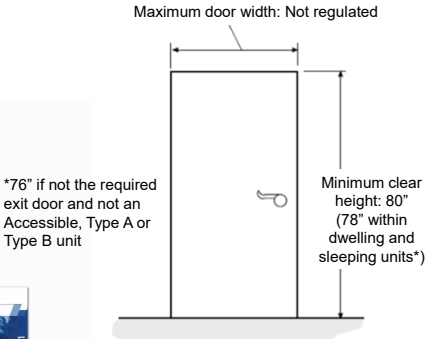


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Size of Doors



Section 1010.1.1



Maximum door width: Not regulated

*76" if not the required exit door and not an Accessible, Type A or Type B unit

Minimum clear height: 80" (78" within dwelling and sleeping units*)



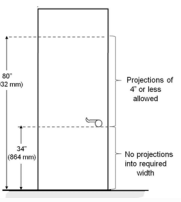
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Doorway Projections

Section 1010.1.1.1

- Maximum 4-inch projections into required clear opening width permitted at 34" above floor
 - No limit on projections when more than 80" above floor
- Door closers, overhead door stops, power door operators and electromagnetic door locks permitted to be 78" minimum above floor.





80" (2032 mm)

34" (864 mm)

Projections of 4" or less allowed

No projections into required width



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Door Swing

Section 1010.1.2

Egress doors shall be of a side-hinged swinging, pivoted or balanced door type, except for:

Private garages and office, factory and storage areas with an occupant load ≤ 10

Group I-3 occupancies used as a place of detention

Critical and intensive care patient rooms within suites of health care facilities

Doors within or serving individual dwelling units of Groups R-2 and R-3

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Door Swing (cont.)

Section 1010.1.2

Egress doors shall be of a side-hinged swinging, pivoted or balanced door type, except for:

In other than Group H, complying revolving doors

In other than Group H, complying special purpose horizontal sliding, accordion and folding doors

Complying power-operated doors

Bathroom doors within sleeping unit in Group R-1 occupancies

In other than Group H, manually operated, horizontal sliding doors from spaces with an occupant load ≤ 10

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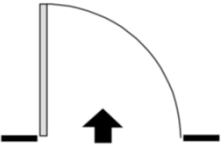
Door Swing

Section 1010.1.2.1

Pivot and side-hinged doors must swing in the direction of exit travel where serving a room or area containing:

an occupant load of 50 or more, or

a Group H occupancy.






Direction of exit travel

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Door Unlatching and Opening Force

Section 1010.1.3

- Force to unlatch doors where door hardware operates by:
 - Push or pull: The operational force to unlatch the door shall not exceed 15 pounds.
 - Rotation: The operation force to unlatch the door shall not exceed 28 inch-pounds.





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Door Unlatching and Opening Force

Section 1010.1.3

- Force to open doors:
 - For interior swinging egress doors that are manually operated, other than doors required to be fire rated, the:
 - Pushing or pulling force to open the door shall not exceed 5 pounds.
 - For other swinging doors, sliding doors, folding doors, and door required to be fire rated, the door shall:
 - Require not more than a 30-pound force to be set in motion, and
 - Move to a full-open position when subjected to not more than a 15-pound force.



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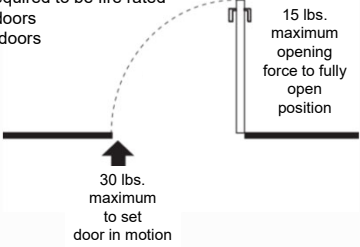
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Door Unlatching and Opening Force

Section 1010.1.3

Applicable to:

- Exterior swinging doors
- Doors required to be fire rated
- Sliding doors
- Folding doors





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Door Operations

Section 1010.2

- A fundamental requirement for egress doors mandates that such doors shall be “readily openable from the egress side without the use of a key or special knowledge or effort.”
 - This provision is one of the most commonly applied “performance” provisions in the IBC.
- This requirement is selectively modified based on specific conditions as established in Section 1010.2.





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Unlatching of Egress Doors

Section 1010.2.1

- The unlatching of any door for egress to require a maximum of one motion in a single linear or rotational direction to release all latching and all locking devices.
- Exceptions for:
 - Places of detention or restraint
 - Locations where manually operated bolt locks are permitted
 - Doors with automatic flush bolts as permitted
 - Doors from Group R individual units as permitted





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Accessible Door Hardware

Section 1010.2.2

- The operation of devices on those doors required to be accessible shall not require:
 - Tight grasping
 - Tight pinching
 - Twisting of the wrist
- Includes door handles, pulls, latches, locks and other operating devices.




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Hardware Height

Section 1010.2.3

- Door handles, pulls, latches, locks and other operating devices to be installed 34 inches minimum and 48 inches maximum above the finished floor.
- Locks used only for security purposes and not used for normal operation are permitted at any height.



48" maximum
34" minimum



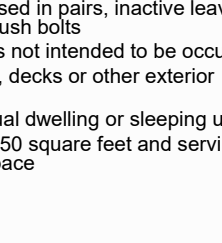
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Permissible Locks and Latches

Section 1010.2.4, #1, #4, #7, #9, #10

- Locks and latches are permitted to prevent the operation of doors in the following situations:
 - Places of detention or restraint
 - Where doors are used in pairs, inactive leaves having automatic flush bolts
 - Doors serving roofs not intended to be occupied
 - Doors to balconies, decks or other exterior spaces:
 - Serving individual dwelling or sleeping units, or
 - No more than 250 square feet and serving a private office space



48" maximum
34" minimum



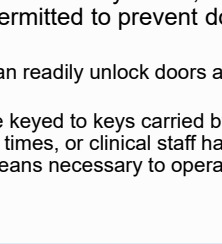
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Permissible Locks and Latches

Section 1010.2.4, #2

- In Group I-1, Condition 2 and Group I-2 occupancies where clinical needs of care recipients require containment, or where such persons pose a security threat, locks and latches are permitted to prevent door operation where:
 - All clinical staff can readily unlock doors at all times, and
 - All such locks are keyed to keys carried by clinical staff at all times, or clinical staff have codes or other means necessary to operate the locks at all times.



48" maximum
34" minimum






2021 IBC Significant Nonstructural Changes120

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Permissible Locks and Latches

Section 1010.2.4, #8

- Where occupants must egress from an exterior space through the building, exit access doors permitted to equipped with an approved locking device.
 - Applicable to enclosed courtyards, occupied roofs, decks and other exterior areas
 - Not applicable to egress courts
- Six conditions must be met in order for the locking devices to be permitted:




2021 IBC Significant Nonstructural Changes

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Permissible Locks and Latches

Section 1010.2.4, #8

- The conditions include:
 - Maximum occupant load posted per Section 1004.9 inside building adjacent to all exit access doorways
 - Weatherproof telephone or two-way communication system installed on exterior side adjacent to at least one required exit access door
 - Locking device to be key-operated and readily distinguishable as locked
 - Minimum 5 square-foot clear window or glazed door opening provided at each exit access door
 - Signage posted on interior at each locked door stating "THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED"
 - Occupant load of exterior area limited to 300

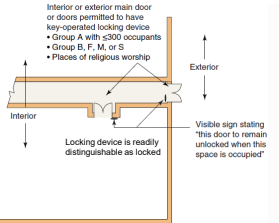


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Permissible Locks and Latches

Section 1010.2.4, #3

- Main door or doors are permitted to be equipped with key-operated locking devices from the egress side where three conditions are met:





Interior or exterior main door or doors permitted to have key-operated locking device

- Group A with ≤300 occupants
- Group B, F, M, or S
- Places of religious worship

Locking device is readily distinguishable as locked

Visible sign stating "this door to remain unlocked when this space is occupied"

*Allowance may be revoked by building official for due cause



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Permissible Locks and Latches

Section 1010.2.4, #5

- Allowance for doors from individual dwelling units or sleeping units of Group R having an occupant load of 10 or less:

Night latch
Deadbolt
Security Chain

48" maximum
34" minimum

No height limit

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Bolt Locks

Section 1010.2.5

- Manually operated surface-mounted bolts and manually operated flush bolts are prohibited.
- **Exceptions:**
 - Doors in individual dwelling units or sleeping units that are not required for egress
 - The "inactive" leaf of a pair of doors that serve a storage or equipment room
 - In Groups B, F or S with an occupant load < 50, the "inactive" leaf in a pair of doors
 - The "inactive" leaf of a pair of doors in Groups B, F or S which are fully sprinklered
 - The "inactive" leaf serving patient care rooms in Group I-2 occupancies

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Panic and Fire Exit Hardware

Section 1010.2.9

- Unless door is not provided with a lock or latch, panic hardware or fire exit hardware is required on swinging doors serving:
 - Group H occupancies
 - Group A occupancies with an occupant load of ≥ 50 , except:
 - Main exit when the OL < 300, or it is a place of worship, per Section 1010.2.4, #3
 - Doors permitted to be electrically locked per Section 1010.2.11 or 1010.2.12
 - Exit access doors serving occupied exterior areas in accordance with Section 1010.2.4, #8
 - Courtrooms in compliance with Section 1010.2.13, #3
 - Group E occupancies with an occupant load of ≥ 50 , except:
 - Doors permitted to be electrically locked per Section 1010.2.11 or 1010.2.12

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Panic and Fire Exit Hardware

Section 1010.2.9

- Unless door is not provided with a lock or latch, panic hardware or fire exit hardware is also required on swinging egress doors serving:
 - Refrigeration machinery rooms > 1,000 sf
 - Minimum of two exit or exit access doorways that swing in direction of travel also required
 - Transformer vaults, rooms designated for batteries or energy storage systems, and modular data centers
 - Rooms containing electrical equipment rated > 800 amperes that contain overcurrent, switching or control devices and where egress door < 25 feet from the equipment working space
 - Door shall swing in direction of egress travel

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Panic and Fire Exit Hardware

Section 1010.2.9.3

Extend at least 1/4 of door width from latch side

34" min. 48" max.

Unlatching force 15 lbs. max.

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Panic and Fire Exit Hardware

Section 1010.2.9.4

- Where balanced doors are used and panic hardware is required:

Push-pad type panic hardware required

Half door width maximum measured from latch side

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[illegible]

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Delayed Egress
Section 1010.2.13

- Delayed egress locking systems are permitted to be installed on doors serving the following occupancies:
 - Group B, F, I, M R, S and U occupancies
 - Group E classrooms with occupant load < 50
 - Group A-3 and B courtrooms in sprinklered buildings (not permitted on main exit or exit access doorway)
- Buildings shall be equipped with an:
 - Automatic sprinkler system, or
 - Automatic smoke or heat detection system.

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Delayed Egress Locking Systems
Section 1010.2.13.1

- Delayed egress locking system to deactivate upon:
 - Actuation of sprinkler system or fire detection system,
 - Loss of power controlling lock or lock mechanism
 - Signal from fire command center or other approved locations
- Initiation of irreversible process to active an audible signal in vicinity of door
- Rearming delay electronics by manual means only
- Maximum unlocking delay of 15 seconds
- 30 seconds when approved by building official

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Delayed Egress Locking Systems
Section 1010.2.13.1

- Egress path from any point shall not pass through more than one delayed egress locking system.
 - Maximum of two such systems permitted under special conditions in Group I occupancies
- In other than Group I occupancies, sign to be provided on door, above and within 12 inches of door exit hardware.
- Emergency lighting to be provided on egress side of door
- Locking system to be listed per UL 294.

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Delayed Egress Locking Systems

Section 1010.2.13.1







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Controlled Egress Doors in Group I-1 and I-2

Section 1010.2.14

- Electric locking systems permitted to be locked in means of egress in Group I-1 and I-2 occupancies where clinical needs of persons receiving care require their containment.
- Building required to be:
 - Sprinklered per NFPA 13, or
 - Provided with an approved automatic smoke detection system





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Controlled Egress Doors in Group I-1 and I-2

Section 1010.2.14

- Doors must operate as follows:
 - Door operating procedures shall be described and approved as part of the emergency planning and preparedness required by IFC
 - Clinical staff shall have the keys, codes or other means necessary to operate the locking devices
 - Emergency lighting shall be provided at the doors where the special locking arrangements are located
 - Door locking system units are listed in accordance with UL 294







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Controlled Egress Doors in Group I-1 and I-2 Section 1010.2.14

- The following requirements also apply, except to:
 - Areas occupied by persons who require restraint or containment in a psychiatric or cognitive treatment area
 - Areas where a listed egress control system is used to reduce the risk of child abduction from nursery and obstetric areas of a Group I-2 hospital
- Doors to unlock upon actuation of sprinkler system or smoke detection system
- Door to unlock on loss of power controlling lock
- Locking system capable of being unlocked by switch located at fire command center, a nursing station, or other approved location
- Building occupant not required to pass through more than one door equipped with such lock





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Special Doors Section 1010.3

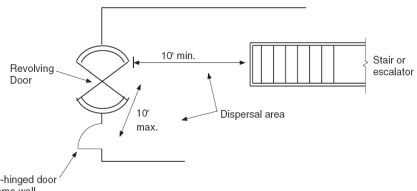
- Special provisions are applicable to the following types of doors:
 - Revolving doors
 - Power-operated doors
 - Special purpose horizontal sliding, accordion or folding doors
 - Security grilles





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Revolving Doors Section 1010.3.1





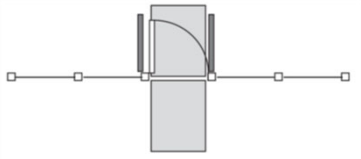
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Power-operated Doors

Section 1010.3.2

- Power-operated doors must comply with one of the following standards to be acceptable for egress purposes:
 - Full-power doors—BHMA A156.10
 - Power-assisted/low-energy swinging doors—BHMA A156.19





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Doors and Door Swing Activity

1. Identify any direction of door swing problems in the South Wing of the **1st Floor**.

Interior exit stairway door at H/5.4





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Doors and Door Swing Activity

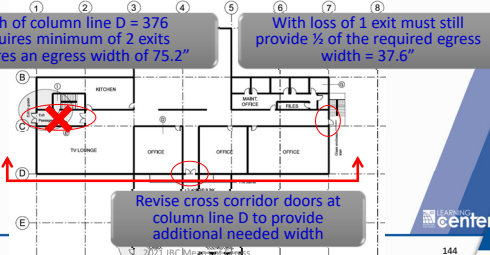
2. Identify any direction of door swing issues in the North Wing on the **1st Floor**.



Lecture rooms
Stair door @ grid line H/6
Corridor door @ D/4

OL north of column line D = 376
376 requires minimum of 2 exits
376 requires an egress width of 75.2"

With loss of 1 exit must still provide 1/2 of the required egress width = 37.6"

Revise cross corridor doors at column line D to provide additional needed width





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Doors and Door Swing Activity

3. Identify any direction of door swing problems in the Basement.

Classroom door if used as an exit access door from Lab 3.

4. Evaluate the doors in the vestibule in on the Basement. There are two doors in series with each other when exiting from the corridor. Is there adequate clearance provided?

Yes. However, there is a potential conflict at the interior exit stairway door.



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Corridors and Exit Passageways

Module 7





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Corridors vs. Exit Passageways

Feature	Corridor	Exit Passageway
Component of egress	Exit access	Exit
One direction of travel	Possibly (limitations based on length and number of persons served)	Yes (single directional travel typically permitted)
Fire-resistance rated construction	Possibly (constructed as fire partition)	Yes (constructed as fire barrier)
Provides access to storage areas, mechanical rooms, etc.	Yes	No (except in covered mall buildings)
Travel distance regulated	Yes	No
Openings	No limitations (protected as applicable)	Limited to egress doors from normally occupied spaces



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Width and Capacity

Section 1020.3

7' 6" minimum height
IBC Section 1003.2

36" minimum
Occupant load < 50

44" minimum
Occupant load ≥ 50

Additional width requirement
Based on Section 1005.3.2

Additional provisions in Table 1020.3

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REFER TO

CODE BOOK

2021 IBC

Table 1020.3

Page 10-34

TABLE 1020.3

MINIMUM CORRIDOR WIDTH

OCCUPANCY	MINIMUM WIDTH (inches)
Any facility not listed in this table	44
Access to and utilization of mechanical, plumbing or electrical systems or equipment	24
With an occupant load of less than 50	36
Within a dwelling unit	36
In Group E with a corridor having an occupant load of 100 or more	72
In corridors and areas serving stretcher traffic in ambulatory care facilities	72
Group I-2 in areas where required for bed movement	96

For SI: 1 inch = 25.4 mm.

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Encroachment

Section 1005.7

- Doors, when fully opened, shall not reduce the required means of egress width by more than 7".
- Doors in any position shall not reduce the required width by more than one-half.
 - Exception:** The restrictions on a door swing shall not apply to doors within individual dwelling units and sleeping units of Groups R-2 and R-3.
- Other nonstructural projections such as trim and similar decorative features shall be permitted to project into required width a maximum of 1½" on each side.

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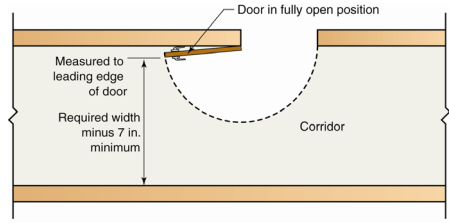
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Encroachment Section 1005.7





Door in fully open position

Measured to leading edge of door

Required width minus 7 in. minimum

Corridor

Does not apply to dwelling units and sleeping units

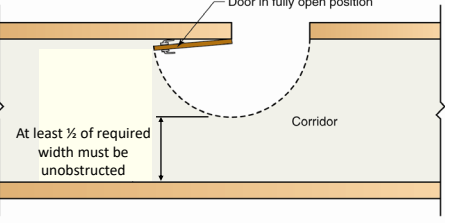


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Encroachment Section 1005.7





Door in fully open position

At least 1/2 of required width must be unobstructed

Corridor


Does not apply to dwelling units and sleeping units



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REFER TO
CODE BOOK

2021 IBC
Table 1020.2
Page 10-34

TABLE 1020.2 CORRIDOR FIRE-RESISTANCE RATING

OCCUPANCY	OCCUPANT LOAD SERVED BY CORRIDOR	REQUIRED FIRE-RESISTANCE RATING (hours)	
		Without sprinkler system	With sprinkler system
H-1, H-2, H-3	All	Not Permitted	1 ^c
H-4, H-5	Greater than 30	Not Permitted	1 ^c
A, B, E, F, M, S, U	Greater than 30	1	0
R	Greater than 10	Not Permitted	0.5 ^e /1 ^d
I-2 ^a	All	Not Permitted	0
I-1, I-3	All	Not Permitted	1 ^{b, c}
I-4	All	1	0



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Exit Passageways

Section 1024

- Exit passageways to be only used for:
 - Means of egress
 - Circulation path
- Minimum capacity of exit passageways based on Section 1005.1, with minimum width not less than 44 inches (36 inches permitted when serving < 50 occupants)
- Exit passageways to be constructed with minimum 1-hour fire barriers, horizontal assemblies, or both.
 - Minimum 2-hour rating required when exit passageway used as an extension of a 2-hour interior exit stairway.

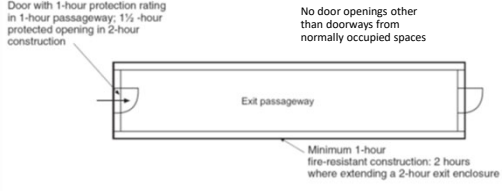


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Exit Passageways

Section 1024



*Maximum transmitted temperature < 450°F above ambient at end of 30 minutes of fire test. (Temp. rise not regulated in sprinklered building)





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Exit Passageways

Section 1024

- Equipment and ductwork for exit passageway ventilation must be independent of other building ventilation systems, and:
 - Be located at the building's exterior and directly connect to the enclosure by ductwork in complying shafts, or
 - When located within the enclosure, receive intake air taken directly from the outdoors and exhaust air directly to the outside, or utilize ducts within complying shafts, or
 - When located within the building, be separated from the remainder of the building, including other mechanical equipment, through the use of complying shafts.



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Corridors and Exit Passageways Activity

1. Determine the required fire-resistance rating for the following walls:

A. Corridor wall A on the [3rd Floor](#)



0-HR; Section 1020.2, Exc 4; Table 1020.2

B. Exit Passageway wall E on the [1st Floor](#)

2-HR; Sections 1023.2, 1024.3

C. Lobby walls at K/L and 5/6 on the [1st Floor](#)

0-HR; Section 1028.2, Exc 1 with 1-HR floor



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Corridors and Exit Passageways Activity



2. Determine the minimum required width for the following corridors:

A. Corridor in the teaching assistants' area on the [3rd Floor](#)

36"; OL <50; Table 1020.2, Section 1005.3.2

B. Main corridors in North Wing of the [3rd Floor](#)

44"; OL <50; Table 1020.2, Section 1005.3.2





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Stairways

Module 8



2021 IBC Means of Egress



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Stairways

Sections 202 and 1011.1

- **Stair.** A change in elevation, consisting of one or more risers.
- **Stairway.** One or more flights of stairs, either exterior or interior, with the necessary landings and platforms connecting them, to form a continuous and uninterrupted passage from one level to another.
 - All stairways that serve occupied portions of a building must comply with stairway provisions in Section 1011





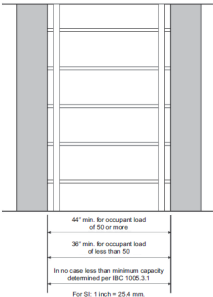
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Width and Capacity

Section 1011.2

- Minimum stairway width of 44 inches required
 - Stairways serving an occupant load < 50 to have minimum width of 36 inches
- In addition, required capacity of stairway to be determined by Section 1005.1





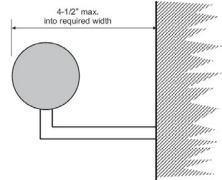
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Horizontal Projections

Section 1014.8

- Projections into the required width not to exceed 4½ inches at or below the handrail height.
 - Projections not limited above minimum headroom height of 80 inches



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Headroom

Section 1011.3

Soffit or other construction

6'-8" min. Measured vertically

Line connecting edge of nosings

Headroom regulated until line intersects landing (one tread depth beyond bottom riser)

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Stair Treads and Risers

Section 1011.5

Handrails - IBC Section 1014

34" - 38"

One tread depth extension

4" min. rise
7" max. rise

11" min. tread run

Maximum construction variation permitted:
• 3/8" for tread run
• 3/8" for riser height

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Stair Treads and Risers

Section 1011.5

Handrails - IBC Section 1014

34" - 38"

10" minimum run

4" minimum rise
7 1/2" maximum rise

Section 1011.5.2, Exception 3
R-3; and Group U accessory to R-3;
Within dwelling units in R-2

For SI: 1 inch = 25.4 mm



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Dimensional Uniformity

Section 1011.5.4

- Stair treads and risers to be of uniform size and shape.
- Tolerance of 3/8 inch permitted within any flight of stairs between:
 - Largest and smallest riser height, and
 - Largest and smallest tread depth.



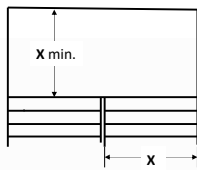
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Stairway Landings

Section 1011.6



- There shall be a floor or landing at the top and bottom of each stairway.
- Landing to have minimum depth equal to actual width of stairway



X min.

X

X = the actual width of the stairway

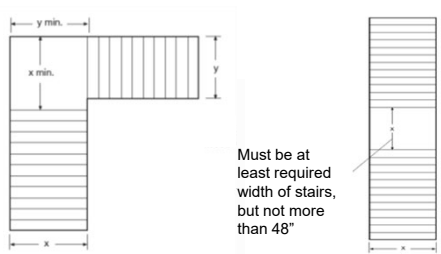


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Stairway Landings

Section 1011.6





y min.

x min.

y

x

Must be at least required width of stairs, but not more than 48"





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Stairway Construction

Section 1011.7

- Stairways shall be built of materials consistent with those permitted based on the building's type of construction, except:
 - Wood handrails are permitted in all types of construction
 - Interior exit stairways in "podium" buildings when in conformance with Section 510.2, Condition 4





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Stairway Construction

Sections 1011.7.1, 1011.7.2

- Walking surfaces of treads and landings may be sloped a maximum of 1:48 (2%).
 - Outdoor stairways and landings to be designed such that water will not accumulate on walking surfaces
- Treads and landing to have a solid surface, except:
 - Openings of a size not to permit passage of ½" diameter sphere permitted. Elongated openings place so long dimension is perpendicular to direction of travel.
 - Passage of up to a 1 1/8" sphere permitted in Groups F, H and S, other than parking structures accessible to the public.





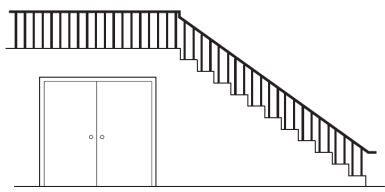
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Enclosures Under Interior Stairways

Section 1011.7.3

- Walls and soffits within enclosed usable spaces under stairways to be protected 1-hour, or 2 hours for a 2-hour interior exit stairway.
 - Only ½" gypsum board protection required within individual dwelling units of Groups R-2 and R-3





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Enclosures Under Exterior Stairways

Section 1011.7.4

- Usable space under exterior exit stairways is to be completely enclosed in minimum 1-hour fire-resistance-rated construction.
- The open space under exterior stairways shall not be used for any purpose.



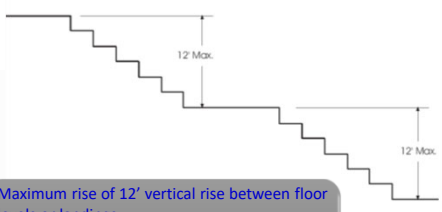
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Vertical Rise

Section 1011.8



Maximum rise of 12' vertical rise between floor levels or landings.
Exception:
Spiral stairways used as a means of egress from technical production areas.



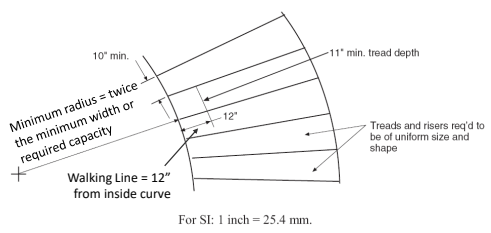
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Curved Stairways

Section 1011.9



Minimum radius = twice the minimum width or required capacity

Walking Line = 12" from inside curve



For SI: 1 inch = 25.4 mm.

10" min.

11" min. tread depth

12"

Treads and risers req'd to be of uniform size and shape



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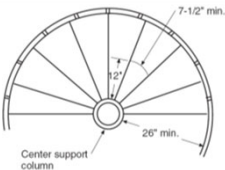
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Spiral Stairways

Section 1011.10

- Spiral stairways can be used as a part of the means of egress if:
 - Located within a dwelling unit, or
 - Used for egress from a space ≤ 250 square feet with ≤ 5 occupants, or
 - Used for egress from technical production areas




Center support column


7-1/2" min.

12°

26" min.



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Handrails

Section 1011.11


- Flights of stairs to have handrails on each side, except:
 - Decks, patios and walkways may have a single change of elevation without handrails if landing depths on each are compliant.
 - Within dwelling units, a handrail is permitted on only one side.
 - Within dwelling units and sleeping units in Groups R-2 and R-3, elevation changes of 3 or fewer risers do not require handrails.
 - In Group R-3, an elevation change of a single riser at an entrance or egress door does not require a handrail.



Handrail on both sides



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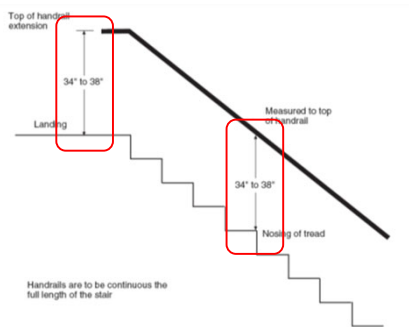


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Handrail Height

Section 1014.2



Top of handrail extension

34" to 38"


Landing

Measured to top of handrail


34" to 38"

Nosing of tread

Handrails are to be continuous the full length of the stair



2021 IBC Means of Egress



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Handrail Graspability – Type I

Section 1014.3.1

- Required handrails to be Type I or provide equivalent graspability.
- Exception for:
 - Individual dwelling units of Group R-2
 - Group R-3
 - Group U accessory to Group R-3 or individual Group R-2 units

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Handrail Graspability – Type II

Section 1014.3.2

- Type II handrails only permitted within dwelling units of Group R-2, in Group R-3, and in Group U accessory to Group R-3 or individual Group R-2 units.

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Handrail Continuity and Clearance

Sections 1014.4 and 1014.7

- Handrail gripping surfaces to be continuous without interruption by newel points or other obstructions
 - Handrail or balusters attached to bottom of handrail are not considered obstructions if no projections beyond handrail width within 1½ inches of bottom of handrail.
- Clear space between handrail and a wall or other surface to be at least 1½ inches.

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Handrail Continuity and Clearance

Sections 1014.4 and 1014.7

Attached to bottom surface

Bracket or baluster not considered an obstruction

Projections beyond sides can obstruct use

1-1/2" min.

1-1/2" min.

1-1/2" min.

1-1/2" min.

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Handrail Extensions

Section 1014.6

- Handrails shall return to a wall, guard or walking surface, or shall be continuous to the handrail to an adjacent flight of stairs.

Return to wall or guard

Return to walking surface**

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Handrail Extensions

Section 1014.6

- Where handrails are not continuous between flights, they shall extend:
 - At least 12 inches beyond top riser
 - At slope for depth of one tread beyond bottom riser

Handrail

12" Min.

34" to 38"

34" to 38"

Extension "x": Continues to slope for the depth of one tread beyond bottom riser

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Intermediate Handrails

Section 1014.9

- Intermediate handrails to be located such that all portions of stairway's required capacity are within 30 inches of a handrail.

- On monumental stair, handrails to be located along the most direct path of egress travel.

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Exit Access Stairways

Section 1019.3

- Exit access stairways that serve floor levels within a single story, such as mezzanines, are not required to be enclosed.
- Exit access stairways between stories in Groups I-2 and I-3 to be enclosed by a shaft enclosure.

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Exit Access Stairways

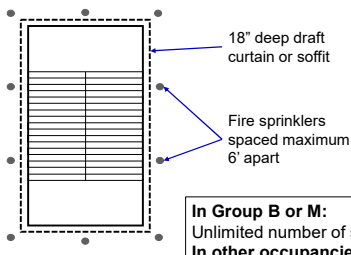
Section 1019.3

- In other than Group I-2 and I-3 occupancies, exit access stairways shall also be enclosed, except:
 - When serving or atmospherically communicating between two stories (such interconnected stories shall not be open to other stories)
 - When connecting ≤ 4 stories within an individual dwelling unit or sleeping unit in a Group R-1, R-2 or R-3 occupancy
 - Within an atrium or open parking garage
 - Between the balcony, gallery or press box and an assembly floor
- In sprinklered buildings where openings are protected by draft curtains and closely-spaced sprinklers per Exception 4.

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Interior Exit Access Stairways

Section 1019.3, Exception 4





18" deep draft curtain or soffit

Fire sprinklers spaced maximum 6' apart

In Group B or M:
Unlimited number of stories

In other occupancies:
Limit of 4 stories connected






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Interior Exit Stairways

Section 1023.1

- All interior exit stairways shall be enclosed and:
 - Lead directly to the exterior of the building, or
 - Be extended to the building's exterior by means of an exit passageway, or
 - Comply with Section 1028.2 addressing interior exit discharge.
- Interior exit stairways shall only be used for the following purposes:
 - Means of egress
 - Circulation paths

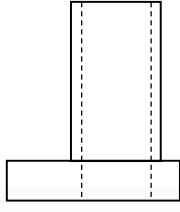


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Interior Exit Stairways

Section 1023.2



- Enclosure construction:
 - ≥ 4 stories: Minimum 2-hour fire-resistance
 - < 4 stories: Minimum 1-hour fire-resistance
 - Not less than floor assembly penetrated, but need not be more than 2 hours
- Door assemblies:
 - Self-closing or automatic-closing
 - Minimum 1-hour rating for 1-hour enclosures
 - Minimum 1½-hour rating for 2-hour enclosures





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Interior Exit Stairway Openings

Section 1023.4

- Opening protectives to comply with Section 716.
- Other than exterior openings permitted to be unprotected, openings in interior exit stairways limited to:
 - Egress doors into the enclosure from normally occupied spaces, and
 - Egress from the enclosure.
- Elevators shall not open into interior exit stairways.





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Interior Exit Stairway Penetrations

Section 1023.5

- Penetrations into or through interior exit stairways are prohibited except for the following:
 - Equipment and ductwork necessary for independent ventilation or pressurization
 - Fire protection systems
 - Two-way communication systems
 - Electrical raceway for fire department communication systems
 - Electrical raceway serving the stairway (must terminate in a steel box ≤ 16 square inches)
 - Structural elements supporting the stairway enclosure (such as beams or joists)





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Interior Exit Stairway Ventilation

Section 1023.6

- Equipment and ductwork for interior exit stairway ventilation must:
 - Be located at the building's exterior and directly connect to the enclosure by ductwork in complying shafts, or
 - When located within the enclosure, receive intake air taken directly from the outdoors and exhaust air directly to the outside, or utilize ducts within complying shafts, or
 - When located within the building, be separated from the remainder of the building, including other mechanical equipment, through the use of complying shafts.



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Interior Exit Stairway Exterior Walls

Section 1023.7

Protection not required

Interior exit stairway

Openings protected 3/4 hour*

Wall 1-hour fire-resistance rated*

Exterior

Nonrated wall or having unprotected openings

* Protected to a height of 10 feet above topmost landing or roof, whichever is less.
For SI: 1 foot = 304.8 mm, 1°C = [(°F) - 32]/1.8

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Discharge Identification

Section 1023.8

Down to exit

Approved barrier

Up to exit

Basement

EXIT Directional sign per IBC Section 1013

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Stairway Identification Signs

Section 1023.9

- Identification signs to be provided at each floor level landing in an interior exit stairway connecting more than three stories.

Exit discharge

Direction/location

Stair identification

Roof access ?

Floor level

Upper terminus

Lower terminus

Exit Discharge at 1st Floor

North Stair

No Roof Access

5

Access to Floors 1 through 10

5 Feet Above Floor

Floor Landing

IBC

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Exterior Exit Stairways

Section 1027.2

- Exterior exit stairways serving as a portion of the means of egress are:
 - Limited to buildings ≤ 6 stories above grade plane
 - Prohibited for high-rise buildings and Group I-2 occupancies

The diagram shows a cross-section of a building with an 'Exterior stairway' leading from the 'Building Interior' to a 'Yard, court or public way'.

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Exterior Exit Stairways

Section 1027.3

- Exterior exit stairways shall be open on at least one side, except for required structural elements, handrails and guards.
- Openings are to be located at each:
 - Floor level, and
 - Intermediate landings

The diagram shows a detail of an exterior exit stairway. It specifies a 'Min. 35 sq. ft. opening' and states 'No credit for area < 42 in height'. A '42 min. guard' is also indicated, with the 'Floor or landing' shown at the base.

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Exterior Exit Stairways

Section 1027.5

- Exterior exit stairways are to have a minimum fire separation distance of 10 feet from:
 - Adjacent lot lines
 - Other portions of building
 - Other buildings on same lot

The diagram shows an 'Exterior stairway' adjacent to a 'Building interior'. It indicates a '10 ft. min.' fire separation distance from the 'Property line or adjacent building'. A note specifies 'Open on one side min. 35 sq. ft.'.

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Exterior Stairways Protection

Section 1027.6

- Exterior exit stairways to be separated from the interior of the building per Section 1023.2.

10' minimum

Minimum 1-hour construction with minimum 45-minute door assemblies

Minimum 2-hour wall construction with any door assemblies a minimum of 90 minutes to extend width of stairway

10' minimum

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Open-ended Corridors

Section 1027.6, Exception 3

- Separation is not required for complying open-ended corridors.
 - The building, including open-ended corridors and stairways, to be sprinklered throughout.

Separation not required

Corridor

Sprinklered throughout

Exterior exit stairway

Clear opening, Min. 35 sq. ft. or exterior stairway required

Corridor

>45°

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Stairways Activity

- What is the required fire-resistance-rating for the wall G on the **1st Floor** at Column Line 7?

1-HR minimum for portion of wall within 10' of stairway enclosure; Section 1023.7
- What is the required fire-resistance-rating for wall I on the **1st Floor** near the Kitchen?

2-HR
Section 1023.2

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Stairways Activity



3. With regard to the vestibule on the Basement Level at Column Line C:

A. What is the fire-resistance-rating for the West wall?

A fire partition.
Section 1028.2, Exc. 2.3

B. What is the fire-resistance-rating for doors in the West wall?

A minimum ¾ rating is required;
Table 716.1(2)





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Stairways Activity

4. Are there any concerns with the stairway on the 1st Floor at Column Line H?

The enclosure does not extend to an exit or exit discharge by means of an exit passageway. Section 1023.1.





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Horizontal Exits

Module 9





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Horizontal Exits

Sections 202, 1026.1

- A horizontal exit:
 - Consists of fire-resistance-rated construction and opening protectives
 - Is intended to compartmentalize portions of a building
 - Creates refuge areas that afford safety from fire and smoke from the area of fire origin.
- Horizontal exits serve as “exits” in a means of egress system
- In other than Group I-2 and I-3 occupancies, horizontal exits shall not serve as:
 - Only exit from a portion of a building, and
 - More than ½ of total number, width and capacity

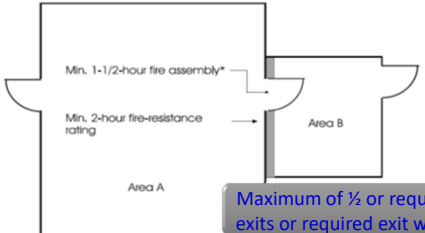


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Horizontal Exits

Section 1026.1



* must be self-closing or automatic closing upon activation of a smoke detector





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Horizontal Exit Separation

Sections 1026.2

- Horizontal exit separation may be achieved by a:
 - Fire wall, or
 - Fire barrier, horizontal assembly or both
- Minimum required fire-resistance rating of separation to be 2 hours.
 - Openings protected per Section 716.
 - Duct and transfer openings to be protected by both fire and smoke dampers.
- Horizontal exit to be continuous from exterior wall to exterior wall



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Horizontal Exit Separation

Section 1026.2

- Horizontal exit to extend vertically through all building levels, unless
 - Floor assemblies have minimum 2-hour rating with no unprotected openings.

When constructed as fire barrier, wall is continuous from exterior wall to exterior wall and extends from floor to underside of floor or roof above.

Refuge area properly sized (original load plus anticipated)

Horizontal exit

Where floor assemblies have a 2-hour rating with no unprotected openings, wall is not required to extend through all levels.

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Refuge Area

Section 1026.4

- Refuge area to be a:
 - Space occupied by same tenant, or
 - Public area

Exit

Horizontal Exit

Exit

NOTE: Exit for "A" adequate to meet the provisions of Chapter 10 but need not include added capacity imposed by occupants entering through horizontal exit from "B".

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Horizontal Exit Refuge Area

Sections 1026.4

- Refuge area to be adequate to accommodate original occupant load of refuge area plus occupant load anticipated from adjoining compartment.
 - Anticipated occupant load from adjoining compartment to be based on capacity of horizontal exit doors entering the refuge area, or total occupant load of adjoining compartment, whichever is less.

Exit

Horizontal Exit

Exit

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Horizontal Exit Refuge Area Sections 1026.4

Refuge area of at least 555 sq ft, based on $(165+20) \times 3 \text{ sq ft/occ}$

Office 20 occupants

Assembly room 320 occupants

Horizontal exit

33" of clear width provides an egress capacity of 165 $(33" \times 0.20)$

Exiting based upon 20 occupants

Sprinklered building

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Refuge Area Capacity Sections 1026.4.1

- Capacity of refuge area to be computed based on "net" floor area allowance of 3 square feet for each occupant to be accommodated.
- Where horizontal exit forms a smoke compartment in Group I-1, I-2 and I-3 occupancies, and in ambulatory care facilities, capacity addressed in Chapter 4.

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Horizontal Exits Example Section 1026.1

Assume a story with an occupant load of 600

Horizontal exit

300 occupants

300 occupants

150

150

150

150

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Horizontal Exits Example

Horizontal exit

<200' (okay)

<200' (okay)

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Horizontal Exits Activity

In regard to the horizontal exit at the Column Line G on the 3rd Floor:

- What is the minimum required fire-resistance rating of this wall?

2-HR
Section 1026.2

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Horizontal Exits Activity

- What is the maximum occupant load capacity served by this horizontal exit from the South Wing?

4 exits available
Stairway door at Column Line H
Stairway door at Column Line K
Stairway door from Clerical Office
Horizontal exit at Column Line G

OL for South Wing = 273
Stairway door from Clerical Office serves the Clerical Office plus 1/2 of Conference Room = 50
273 - 50 = 223 occupants for the remaining 3 exits
223 ÷ 3 = 75 occupants per exit
75 x 0.2 = 15' of clear exit width required

Horizontal exit serves 75 occupants

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Horizontal Exits Activity

3. What is the maximum occupant load capacity served by this horizontal exit from the North Wing?

OL for North Wing = 180
 $180 \div 3 = 60$ occupants per exit
 $60 \times 0.2 = 12'$ of clear exit width required

Horizontal exit serves 60 occupants

3 exits available
Stairway door at Column Line 7
Stairway door at Column Line 1.2
Horizontal exit at Column Line G

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Horizontal Exits Activity

4. Does the South Wing provide enough area to accommodate the refuge area?

Yes
 $75 \text{ occupants} \times 3 \text{ ft}^2 \text{ per person} = 225 \text{ ft}^2$
Section 1026.4.1

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Egress Illumination and Exit Signs

Module 10

IBC 2021



center

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Exit Signs

Section 1013.1

- Exits signs required:
 - At exit and exit access doors
 - Where necessary to clearly indicate direction of egress travel in cases where exit or path of travel not immediately visible to occupants
- In addition, exit signage to be located:
 - At intervening means of egress doors within exits
 - In corridors and exit passageways such that every point is within 100 feet of the nearest visible sign
 - Reduced distance where required by listed viewing distance of sign



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Exit Signs

Section 1013.1, Exceptions

Exit signs not required in:

1. Rooms or areas with one exit or exit access
2. Main exterior exit doors that are clearly identifiable as exits where approved by the building official
3. Group U occupancies and individual sleeping units or dwelling units in Groups R-1, R-2 or R-3 occupancies
4. Sleeping areas in Group I-3 occupancies
5. Group A-4 and A-5 occupancies on the seating side of vomitories



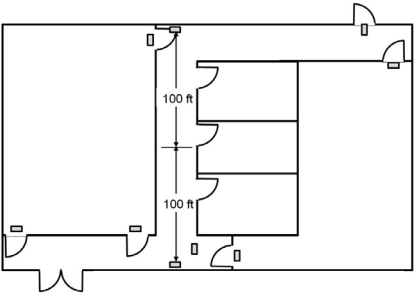
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Exit Signs

Location Activity





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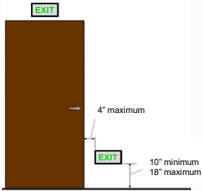
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Floor Level Exit Signs in Group R-1

Section 1013.2

- Where exit signs are required in Group R-1 occupancies, additional low-level exit signs to be provided:
 - Only required in those portions of the means of egress serving guest rooms






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Raised Character and Braille Exit Signs

Section 1013.4

- Tactile exit signs required at:
 - Area of refuge with direct access to a stairway
 - Exterior area for assisted rescue
 - Interior exit stairway
 - Exterior exit stairway
 - Horizontal exit
 - Exit passageway
 - Exit discharge
- Tactile exit signs to consist of:
 - Visible characters
 - Raised characters
 - Braille






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Illumination of Exit Signs

Sections 1013.3, 1013.6

- Exit signs to be externally or internally illuminated at all times
 - Not applicable to tactile signs
- Electrically-powered, self-luminous and photoluminescent exit signs to be listed and labeled in accordance with UL 924.





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Externally Illuminated Exit Signs
Section 1013.6

- Externally-illuminated signs to comply for:
 - Graphics
 - Illumination
 - Power source







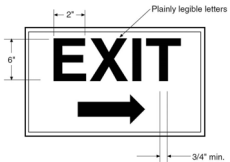
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Externally Illuminated Exit Signs
Section 1013.6

- The word “EXIT” to be in high contrast with background and must be clearly discernable.
- Face of sign to be illuminated from an external source with minimum intensity of 5 footcandles.
- Illumination required for a minimum of 90 minutes after power loss.







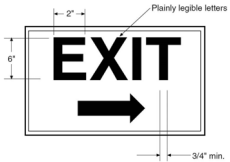
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Means of Egress Illumination
Section 1008.2

- The means of egress serving a room or space to be illuminated at all times the room or space is occupied, except for:
 - Group U occupancies
 - Aisle accessways in Group A
 - Group R-1, R-2 and R-3 dwelling units and sleeping units
 - Group I sleeping units
- Minimum illumination level to be at least:
 - One footcandle at walking surface
 - Ten footcandles along exit access stairways, exit stairways and their required landings







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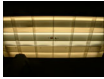

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Emergency Power for Illumination

Section 1008.3

- The power supply for means of egress illumination to be provided by the premises' electrical system.
- In the event of power failure, an emergency electrical system shall automatically illuminate specified areas.
- Emergency power to be provided for ≥ 90 minutes by:
 - Storage batteries
 - Unit equipment
 - On-site generator



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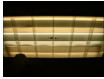

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Emergency Power for Illumination

Section 1008.3

- Where power failure occurs in rooms or spaces that require two or more exits or access to exits, the following areas to be automatically illuminated:
 - Aisles
 - Corridors
 - Exit access stairways and ramps



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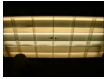

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Emergency Power for Illumination

Section 1008.3

- Where power failure occurs in buildings that require two or more exits or access to exits, the following areas to be automatically illuminated:
 - Interior exit access stairways and ramps
 - Interior exit stairways and ramps
 - Exterior exit stairways and ramps
 - Vestibules and other interior exit discharge areas
 - Exterior landings for exit doorways that lead directly to the exit discharge



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Emergency Power for Illumination

Section 1008.3.5

- Emergency lighting facilities to provide:
 - Initial illumination providing an average of ≥ 1 footcandle
 - At least 0.1 footcandle at any point
 - A maximum-to-minimum uniformity ratio ≤ 40 to 1.
- Illumination levels permitted to decline during the emergency lighting time duration to:
 - 0.6 footcandle average
 - 0.06 footcandle at any point





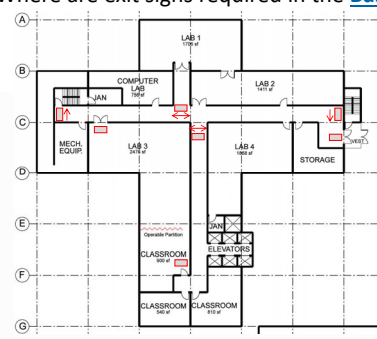
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Exit Signs Activity

1. Where are exit signs required in the Basement?





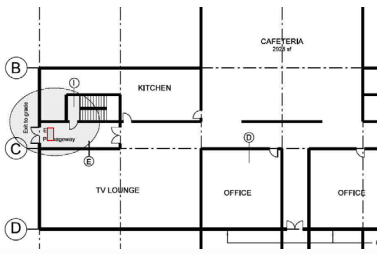
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Exit Signs Activity

2. How many exit signs are needed inside the exit passageway on the 1st Floor?



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Exit Signs Activity

3. Where are exit signs required in the Conference Room and Clerical Office on the **3rd Floor** at Column Line L?

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Exit Discharge

Module 11

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General Exit Discharge Requirements

Section 1028.2

- Exit discharge to be at grade or provide a direct path of egress travel to grade.
- Exit discharge to not reenter a building.
- Interior exit discharge permitted under Exceptions 1 and 2

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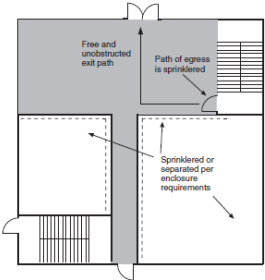
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Interior Exit Discharge

Section 1028.2, Exception 1



- Maximum of 50% of number and required capacity of interior exit stairways permitted to egress through areas on level of discharge, provided:
 - Discharge provided with unobstructed path to exterior exit door that is readily visible and identifiable from point of termination of the enclosure
 - Level of discharge separated from areas below by construction consistent with rating for the enclosure
 - Egress path on discharge level provided with sprinkler protection



Free and unobstructed exit path

Path of egress is sprinklered

Sprinklered or separated per enclosure requirements



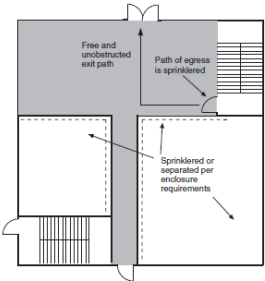
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Interior Exit Discharge



Section 1028.2, Exception 1



Free and unobstructed exit path

Path of egress is sprinklered

Sprinklered or separated per enclosure requirements



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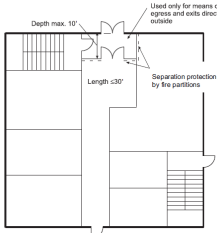
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Exit Discharge

Section 1028.2, Exception 2

- Maximum of 50% of number and required capacity of interior exit stairways permitted to egress through complying vestibule:





Depth max. 10'

Length <30'

Used only for means of egress and exits directly outside

Separation protection by fire partitions



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Exit Discharge

Section 1028.5

- Exit discharge to provide direct and unobstructed access to a public way, except where a complying safe dispersal area is provided:

Area to be provided with safe and unobstructed path of travel from building

Building

50' minimum

Safe Dispersal Area

≥5 ft² per occupant

Area to be permanently maintained and identified

Security Fence

Public Way

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Egress Courts

Section 202, 1029

- An egress court is “a yard or court which provides access to a public way for one or more exits.
- Egress courts to provide for capacity based on occupant load, but no less than 44 inches in width.
 - 36 inches permitted in Groups R-3 and U
- Where an egress court is less than 10 feet in width, court walls to be ≥ 1-hour for height of 10 feet, with openings protected ≥ ¾ hour
- Not required for occupant loads < 10, or Group R-3

Public Way

X

Exceptions for egress courts serving occupant loads of less than 10, as well as for Group R-3 occupancies

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Egress Courts

Section 1029

Public Way

X

Exceptions for egress courts serving occupant loads of less than 10, as well as for Group R-3 occupancies

- Where X is less than 10 feet in width, exterior wall to be minimum 1-hour with minimum 45-minute openings to height of 10 feet or roof height, whichever is less

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Questions?





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Final Reflection

- **What?** What happened and what was observed in the training?
- **So what?** What did you learn? What difference did this training make?
- **Now what?** How will you do things differently back on the job as a result of this training?




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